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EDITORIAL ETCHINGS.

Judging from the favorable comment and criticism which we have been receiving from our friends, and from parties at a distance, we have decided to introduce, from time to time, new improvements in the make up of the Agricultural Student Magazine, and thus increase whatever degree of utility or interest we have already attained. Beginning with this issue we shall run each month a collection of notes under the head of "Veterinary Items." These articles will be furnished by a representative elected from the Veterinary Association of the Ohio State University. Mr. C. W. Eddy now fills this position on the staff, and, judging from his credentials, we may expect something good from his pen in each of the succeeding issues of the magazine.

Another valuable addition to the magazine is the review of the financial and market conditions as compiled by Mr. C. L. Shuck, the market editor of one of the Columbus daily papers. This department, coming as it does from one who has every facility for determining the actual conditions of the markets of the country, should be of much interest and value to those who are directly interested in such affairs, and who have not the time to follow the daily fluctuations of the world's markets. This review, it may be well to state, extends

from the twentieth of one month until the twentieth of the next. Thus, this issue contains a review of the market conditions of the month ending December 20th, 1898, and the February issue will contain a review of the month ending January 20, 1899, and so on. We will be glad to hear from our readers, as to how this addition of new departments impresses them, and any suggestion concerning possible improvements will be given due consideration.

Young men who are considering making flowerculture their life work, and all who are going to specialize along any branch of horticulture, may draw much encouragement from the fact that notwithstanding the great decline in the prices of nearly all products of the husbandman, the price of fine flowers and fruits has remained almost constant during the past few years. Floriculture especially seems to be prospering, and if we are to judge from the money handled by those who deal in cut flowers, the business must be quite lucrative. Again it is a business that is growing every day. People are coming to see the beauty and utility of a fine specimen of bloom from one of our greenhouse marvels, and the demand is growing. Doubtless this is due to the great advance made in supplying new varieties of chrysanthemums, roses, carnations, etc., as it is being done to-

day. And, again, this origination of new varieties may be attributed to the impetus given the work of the florist, and the general interest aroused by the flower shows which are now regular occurrences in many of our larger cities.

It is the old, old question of glory and emulation. Let a man feel that his trade is one that arouses the general admiration, and he instantly takes a personal pride in it and an improvement is the result.

The question of territorial expansion has been occupying the minds of our statesmen and politicians for the past few months, and surely the aspect of our country toward her newly acquired possessions is an important matter. How many of our farmers and horticulturists, however, have given the matter much consideration from the standpoint of the husbandman rather than that of the politician.

The chance for the establishment of new industries in the "new islands of the sea" is unparalleled. The opening for the fruit culturist in the West Indies is said to be exceptionally good, while the islands of the Pacific also furnish much room for progress and improvement, or, we might as well say it, —a brand new start.

May not the graduates of our agricultural colleges be likely to be called into service ere long, to develop these new countries, or to investigate their natural resources for agricultural purposes? Our department of agriculture at Washington spends a great deal of money and labor in investigations in the United States. Should not the same be extended to the new possessions?

If the interest which the members take in the affairs of an organization are any proof of its success, the Asparagus club, of the State University, may be set down at once as a successful venture. As was stated in a previous number of this paper, this club is an experiment. It is novel in organization and

method, it is a new thing in the college of agriculture. It is primarily for the discussion of subjects distinctly horticultural, but other subjects are also brought in and considered in the meetings. The most purely experimental and untried feature of this new organization has proved to be one of its most attractive ones; this feature is the informal character of the meetings. While there is a leader for each meeting, each person present has the same right that one has in a room full of persons in ordinary conversation, and whoever may be talking, must expect to be stopped and questioned. This free method of carrying on the meetings has been found conducive to very good results in obtaining information.

In the death of Justin S. Morrill this country loses one of her oldest and most prominent leaders. Senator Morrill was the oldest man in the United States senate at the time of his death, being nearly ninety years of age. Senator Morrill's death is particularly affecting to the state universities of the land, since it was his "land grant act" that gave them their reason for existing. He has labored long and faithfully in the interest of these institutions and the time is now here when the fruit of his toil has reached the top rung in educational facilities. Let the flags fly at half mast, and the head bow low in respect to the departed champion of free thought, and of the education of the people by the state.

The year just past has been remarkable in many ways. It has marked a change in our country in her own policy and in her relation to the other Powers. It has marked a crisis in the manner of government of the colonies of all countries, and it has been shown that the power of a nation over her colonial possessions does not depend alone upon her own pleasure, but upon the opinion of other nations as well, whenever the laws of humanity and na-

ture are ignored. We might call up innumerable examples of what has been done, and what progress has taken place in the political condition of our country, both internally and as regards other nations, but that has been many times reviewed by others. We would call attention, however, to the remarkable advance made in the export trade of agricultural products.

From the treasury bureau of statistics we get the statements that in 1898 the farmers of the United States will receive more money from abroad for their products than in any preceding year. For the ten months ending October the thirty-first, there is a gain in breadstuffs alone of \$65,000,000 over the corresponding ten months of 1897, the entire receipts being \$250,237,455. This also is \$32,000,000 in excess of the exceptional year of 1892.

During the past year the number of pounds of cotton exported was greater than ever before, and the amount of money received for it was \$13,000,000 in excess of that received last year.

The exportation of practically all farm products has increased. In wheat, corn, rye, oats, oatmeal, cotton, bacon, hams, lard, oleomargarine, fresh beef and many other articles of farm produce, exportations are far in excess of any preceding year. The demand for American corn is steadily increasing in other countries, and this fact is attracting a great deal of attention. The October exports were 12,547,155 bushels against 7,979,087 in the corresponding month of last year. The exports for the ten months ending with October were 170,086,505 against 150,350,373 in the same months of the preceding year. This may be taken to indicate that Europe is developing a taste for American corn.

American oatmeal is rapidly making itself a market abroad. The manufacture of oatmeal was begun only a little over a quarter of a century ago, when its use was suggested by the fact that the rice supply was materially reduced

by a lessened production during the war. This led to the establishment of oatmeal factories and from this time on, not only has an American taste for oatmeal been created, but there is a growing demand for this product abroad. In 1888 the exports were 4,329,293 pounds, while in 1898 the amount sent out of the country was 85,500,270. We quote these facts merely to show the steady growth of the foreign market for our produce and let you draw your own conclusions. To say the least, it is an encouraging prospect from the standpoint of the farmer, to know that the results of his labor and improvement are appreciated abroad.

Since co-operation seems to be the law of today, and since the farmer must fight his way to success by battling with the ups and downs of trade in the same way that men in other lines of work are called upon to do, it would seem that co-operation among the farmers would be conducive to better conditions. To show that this is not a wrong assumption we would refer to the great work being done in Canada by the Ontario Agricultural and Experimental Union. The work of this Union is under the efficient supervision of C. A. Zavitz, experimentalist at the Ontario Agricultural College, and an idea of the work accomplished during 1898 may be had from a brief review. During the year just past, experiments have been carried on as follows:

In Agriculture—From three to six plots of field crops on each of 3,000 farms. In horticulture, four plots of small fruits on each of 225 farms. In apiculture, co-operative tests made by Ontario bee-keepers. In dairying, tests of curing cheese in different factories. In botany, a collection of Ontario's worst weeds has been made. In soil physics, moisture determinations from three districts.

This certainly should make a valuable lot of results, and now the question arises, cannot the Student Union of

Ohio make itself eminently useful in experimental work? It is acknowledged by all experimenters that an experiment carried on in one part of the state may not hold good for another locality at all. Thus the co-operative Unions may become the most practical means of carrying on successful experiments. The Student Union of Ohio certainly has an opportunity.

Agricultural Student Union of Ohio.

The fourth annual meeting of the Agricultural Student Union of Ohio will be held in Townshend Hall, Ohio State University, on January 11, 1899, at 7:30 p. m. This organization, now in the fourth year of its existence, is in a most flourishing condition and all that is needed to make it one of the most beneficial organizations of the kind in the state, as well as one of the most influential, is the earnest co-operation of all students, ex-students and alumni of the Ohio State University, and the progressive farmers of the state. The State University and the Ohio Agricultural Experiment station are doing nobly in supporting this most practical organization.

The coming meeting bids fair to come up to the expectations of the officers in being the most successful meeting which the Union has ever held.

Professor C. A. Zavitz, experimentalist at the Ontario Agricultural College, and secretary of the Co-operative Experimental Union of Ontario, is to be present and will address the Union upon the subject, "Co-operative Experiments in Agriculture for Thirteen Years." The director of experiments, L. M. Bloomfield, will make his annual report.

Mr. F. K. Luke will present a paper upon "University Extension and the Farmer."

Mr. Zavitz is the originator of this plan of experimentation and is one of the first men in the Dominion in this work. We may expect much good sound advice, and inspiration from his

presence at the coming meeting. You can not well afford to miss this meeting. Come to Columbus and attend the State Farmers' Institute and Agricultural Convention, but save the night of Wednesday, January 11th, for the meeting of the Agricultural Student Union of Ohio.

PROGRAM

Of the State Farmers' Institute and the Annual State Agricultural Convention, to be held in the House of Representatives, State House, Columbus, Tuesday, Wednesday and Thursday, January 10-12, 1899.

These meetings of the State Farmers' Institute are open and free to all persons who may be interested. The subjects to be considered are important as affecting the agricultural interests of the state. Farmers, breeders, and students of agricultural problems are earnestly requested to attend.

STATE FARMERS' INSTITUTE.

House of Representatives, State House.

TUESDAY, JANUARY 10.

10 o'clock A. M.

Address.....President, Geo. E. Scott
Address—The Future of the Apple Orchard.....Prof. W. J. Green,
The Ohio Agricultural Experiment Station.

Discussion of Subject.

Address—Bacteria..Dr. A. M. Bleile,
Ohio State University, Department of Physiology.

Discussion of Subject.

2 o'clock P. M.

Address—Ohio Wool and Wool Growers..John G. Ickis, Adena, O.

Discussion of Subject.

Address—Horticultural Influences..
.....E. H. Cushman,
President State Horticultural Society.

Discussion of Subject.

Address—Cultivation and Breeding of Corn..M. C. Morris, Shandon, O.

Discussion of Subject.

7:30 o'clock P. M.

Address—Six Months in Alaska....

....J. L. Roudebush, Stonelick, O.

Address—Pedigree, Environment and Pluck....Dr. W. I. Chamberlain, Hudson, O.

WEDNESDAY, JANUARY 11.

10 o'clock A. M.

Address—Agriculture and the School Teacher....Prof. Thos. F. Hunt, Dean of Department of Agriculture, O. S. U.

Discussion of Subject.

Address—Fuel Values of Foods....

....Dr. Georgia Merriman, Bucyrus, O.

Discussion of Subject.

Address—The Modern Beef Animal and How to Produce It.....

....O. E. Bradfute, Cedarville, O.

Discussion of Subject.

2 o'clock P. M.

Address—What the Farmer Should do for Himself..Col. J. H. Brigham, Assistant Secretary U. S. Department of Agriculture.

Discussion of Subject.

Address—Feeds and Feeding.....

...John L. Shawver, Bellefontaine, O.

Discussion of Subject.

Address—Keeping up the Fertility of the Soil....T. C. Laylin, Norwalk, O.

STATE AGRICULTURAL CONVENTION.

House of Representatives, State House.

THURSDAY, JANUARY 12.

10 o'clock A. M.

Prayer.....Rev. C. L. Winget, Columbus, O.

Address of Welcome..Hon. Asa S. Bushnell, Governor of Ohio.

Annual Address.....C. Bordwell, President State Board of Agriculture.

Annual Report.....J. C. Bower, Treasurer State Board of Agriculture.

Report of Auditing Committee.....

...E. C. Ellis, H. S. Grimes, S. H. Ellis.

Appointment of Committees.

Nomination of Candidates for Election as Members of the State Board of Agriculture.

2 o'clock P. M.

Address—What the U. S. Department of Agriculture is Trying to do for the Farmer.....Col. J. H. Brigham, Assistant Secretary U. S. Department of Agriculture.

Discussion of Subject.

Address—A Working Library for the Farmer.....C. G. Williams, Gustavus, O.

Discussion of the Subject.

Address—Important Results from Growing One Thousand Varieties of Farm Crops for Five Years in Succession....Prof. C. A. Zavitz, Director of Co-operative Experiments, Agricultural Experiment Station, Guelph, Ontario.

Discussion of the Subject.

Address—The Training and Care of the Farm Team....H. P. Miller, Sunbury, O.

Discussion of the Subject.

Address—The Relation of Farming to Manufacturing—Legislation...R. H. Wallace, Chillicothe, O.

Discussion of the Subject.

Report of Committee on Resolutions. J. L. Carpenter, Chairman, F. A. Derthick, W. F. Hufford, Committee.

Miscellaneous Business.

7:30 o'clock P. M.

Election of Five Members of the State Board of Agriculture.

While attending the Farmers' Institute at Iberia, Morrow county, Prof. Lazenby was entertained by Mr. Jay Auld, a former student in the College of Agriculture. Mr. Auld and brother are now managing their home farm, and one adjoining.

OHIO STATE ACADEMY OF SCIENCE.

A most successful meeting was the Eighth Annual Meeting of the Ohio Academy, which was held at the Ohio State University on Dec. 29 and 30, 1898.

Following is the program of the meeting:

THURSDAY—Orton Hall.

8:45 A. M. - Meeting of Executive Committee.

9:15 A. M.—Business Meeting of Academy.

9:45 A. M. — Reading of papers.

1. A deep pre-glacial channel in western Ohio and eastern Indiana. 10 min.
.....J. A. Bownocker
2. The division of the macrospore nucleus of *Erythronium*. 15 minutes.
.....John H. Schaffner
3. Some recently discovered pre-glacial cols in Ohio. 15 minutes..W. G. Tight
4. Some observations on *Unio subovatus*. 10 minutes.....F. L. Landacre
5. Some observations on the topography of Athens and vicinity.....
.....H. E. Chapin and C. H. Stearns
6. Two interesting filamentous bacteria from Columbus. 3 minutes.....
.....John H. Schaffner
7. A contribution to a knowledge of the faunistic entomology of Ohio. 20
minutes.....F. M. Webster
8. Some notes on the grape cane gall maker, *Ampelogypter sesostris*. 5
minutes.....F. M. Webster

1:30 P. M.

9. Nutation of the cultivated sunflower. 5 minutes.....John H. Schaffner
10. Some apparent relations of ants to peach aphids, *A. persicae-niger*. 5 min.
.....F. M. Webster
11. Some observations on the pre-glacial drainage of Wayne and associate
counties. 15 minutes.....J. H. Todd
12. A plea for science teaching in the public schools. 10 min...Miss Mary E. Law
13. Micro-photographs of fungus spores. 5 min...A. D. Selby and P. A. Hinman
14. Modern hygiene versus Mosaic hygiene. 20 minutes.....Jas. D. Beer
15. Notes on fasciation. 5 minutes.....Miss L. C. Riddle
16. A galenite geode from Muskingum county. 3 minutes.....W. G. Tight
17. Distribution of the microscopic fungi. 8 minutes.....H. C. Beardslee
18. Notes on ecological plant geography of Summit, Wayne and Medina
counties. 6 minutes.....A. D. Selby
19. Climate of the Philippine Islands. 5 minutes.....E. L. Moseley
20. Development of the macrosporangium of *Hemerocallis fulva*. 5 min.
.....E. L. Fullmer
21. Lichens new to Ohio. 3 minutes.....Edo Claassen

7:30 P. M. — President's Address.

Geographical Teaching and the Geography of Ohio.....W. G. Tight

FRIDAY—Zoological Hall.

9:00 A. M. — Business Meeting.

9:30 A. M. — Reading of papers.

22. Reliability of spore measurements of the fleshy fungi. 8 minutes.....
.....H. C. Beardslee
23. Studies of *Ustilago reiliana*. 8 minutes.....W. A. and K. F. Kellerman
24. A pocket instrument for the approximate determination of distance by
triangulation. 5 minutes.....W. G. Tight

25. A descriptive list of the fishes of the Big Jelloway creek system.....
.....J. B. Parker, E. B. Williamson and R. C. Osburn
26. Additions to the Ohio list of dragon flies.
27. Additions to the Ohio list of butterflies. 10 minutes.....J. S. Hine
28. Some abnormal plant specimens. 3 minutes.....Miss L. C. Riddle
29. Field Notes. 8 minutes.....A. D. Selby
30. A contribution to the life history of Potamogeton. 15 min.....G. M. Holferty
31. Further studies in Embryology. 8 minutes.....Miss L. C. Riddle
32. List of phenograms new to Ohio or rare in and new to counties of north-
ern Ohio. 3 minutes.....Edo Claassen
33. Some rare Ohio plants. 5 minutes.....E. L. Moseley
34. Plants new to the Ohio Catalogue. 5 minutes.....W. A. Kellerman
35. Observations on the Ohio flora. 12 minutes.....W. A. Kellerman
1:30 P. M.
36. The laboratory and the field; their relative importance.....H. E. Chapin
37. Some sources of the Ohio flora. 15 minutes.....A. D. Selby
38. The Illinois Biological Station. 10 minutes.....H. C. Beardslee
- 39 and 40. Lists of Erysipheæ and Uredineæ of Cuyahoga and other coun-
ties of northern Ohio. 5 minutes.....Edo Claassen
41. Remarks on the Hemipterous fauna of Ohio, with a preliminary record
of species. 10 minutes.....Herbert Osborn
42. Occurrence of Phalli near Cleveland. 4 minutes.....H. C. Beardslee
43. A bat new to Ohio. 5 minutes.....John F. Cunningham
44. Twenty-five species of Syrphidæ not previously reported for Ohio.....
.....Jas. S. Hine
45. A female of the Purslane Sawfly, *Schizocerus* Sp., with a male antenna..
.....C. W. Mally
46. The waste or refuse in fruit and nuts.....W. R. Lazenby
47. Life in the Philippines.....E. L. Moseley

In the business meeting on Friday afternoon the following officers were elected for the ensuing year:

President—G. Frederick Wright.
First Vice President—Charles E. Albright.
Second Vice President—A. D. Selby.
Secretary—E. L. Moseley.
Treasurer—Herbert Osborn.

PERSONAL.

The meetings of the Asparagus Club, which are held once a week in the reading room in Horticultural Hall, are both interesting and instructive. The informal character of the club makes every one feel at home, and encourages all in attendance to take part in the discussions. The club meets every Tuesday night at 6:30 and continues in session for about one hour. Meetings are never adjourned nor postponed for vacations, holidays or anything else. Every one interested is welcome and cordially invited to attend.

Some time ago Mr. Philip Baer, who graduated from the College of Agriculture in 1897, and has since been operating a creamery at Gratiot, O., reported that the milk from the herd of one of his patrons had tested over 8 per cent. of butter fat. He also reported that the average of all the milk brought to the creamery by their twenty-one patrons was 5.2 per cent. As 8 per cent. is very high for a herd to test, and as 5 per cent. is a very high average for a community which formed a creamery, an explanation was sought and found in the small amount of milk given. The following is the November report for their creamery:

Patron's No.	Breed of cows.	No. of cows.	Lb. milk delivered by each patron during Nov & Dec.	Lb. milk per day per cow.	Per cent. butter fat during November.	Lb. butter fat per day per cow.
1	Jerseys & S. H.	6	2532	14.1	4.8	.67
2	"	5	1585	10.6	5.4	.57
3	"	4	1865	15.5	5.3	.82
4	"	12	3311	9.2	6.3	.58
5	"	5	855	5.7	6.2	.35
6	"	1	85	2.8	6.3	.18
7	"	13	4322	11.1	5.2	.57
8	Shorthorns.	4	1365	11.4	4.3	.49
9	Jerseys & S. H.	4	1413	11.8	4.6	.54
10	"	2	351	5.9	4.9	.29
11	"	11	2156	6.5	4.7	.30
12	"	16	4751	9.7	4.7	.46
13	Not known.	4	851	7.1	5.0	.36
14	Jerseys.	7	2158	10.2	6.0	.61
15	Shorthorns.	6	1517	8.4	4.4	.37
16	Not known.	4	678	5.7	4.7	.27
17	Jerseys.	3	640	3.5	7.6	.27
18	"	1	441	14.7	4.8	.71
19	Not known.	2	419	7.0	5.2	.36
20	Jerseys.	2	262	4.4	3.6	.16
21	"	3	593	6.6	5.6	.37

It will be noticed that the herds are extremely small, only five herds containing more than six cows each. It is probable that all the patrons made some use for domestic purposes and in the smaller herds this fact may have materially reduced the amount of milk and butter fat per cow delivered to the creamery. For example, Patron No. 18 had but one cow and was delivering nearly three-quarters of a pound of butter fat per day to the creamery. If this cow supplied the needs of a family besides she must have been a fairly good individual.

Herd No. 17 is the one that made the high test, averaging for November 7.6 per cent. of butter fat. On November 8, however, the average of three cows' milk for three days was 8.1 per cent., and on November 17 it was 8.7 per cent. of butter fat for two days' milk. In the first test the cows averaged 5.5 pounds of milk, yielding .45 pounds of butter fat, while on the second test the yield of milk was 4.5 pounds, which yielded .39 pounds of butter fat.

Thus while the per cent. of butter fat was unusually high, the actual amount of butter fat given was small.

It would appear from the above that the patrons of this creamery do not practice winter dairying. Upon the face of this report more than half the herds were not giving profitable returns in November. The writer assumes that the cows were nearly dry, which accounts for the high per cent. of butter fat.

The Columbus Horticultural Society.

Fifty-three years ago last April a few public-spirited men residing in Columbus resolved to organize the Columbus Horticultural Society. At that time there were not more than four like organizations in existence. These were the State Horticultural Societies of Maine, Massachusetts, New York and Pennsylvania. Now national, state, county and township organizations for promoting the interests of horticulture can be numbered by the hundred.

Of the original or charter members of the Columbus Society, but two remain: W. G. Deshler and J. J. Jannev.

During its more than half century of existence these faithful members have ever been true to the best interests of the society. Mr. Deshler was treasurer of the society when it was decided to suspend operations owing to the disturbed conditions brought about by the war of the rebellion. He was directed by the executive committee to invest the money in the treasury, amounting to about two thousand dollars, until the country was at peace again, and the society could resume its work. He did as requested and when the society again became active he reported it had forty-five hundred dollars in the treasury.

The members were astonished and asked for explanations. Mr. Deshler replied: "When I saw an extra good chance to make some money I invested the society's fund instead of my own and have kept on doing so with the result just announced."

The self-sacrificing labors and triumph that crowned their efforts, must be a pleasing remembrance to the older members of the society. They would not part for money with the old-time friendships of fifty years ago. Let us hope that the younger men of the present day will keep up the usefulness of this old society and hand it over to those who come after them greatly enlarged in scope and influence.

WILLIAM R. LAZENBY.

The Ohio State Academy of Science.

The eighth annual meeting of this organization was held in Orton Hall, December 29 and 30.

There was a fair attendance and some of the papers read were of more than usual interest. Among the representatives of the State University presenting papers were Messrs. Kellerman, Osborn, Lazenby, Schaffner, Bownocker, Hine, Landacre, Cunningham, Fullmer, Parker, Williamson, Osburn and Miss Riddle. The State Experiment Station was represented by Messrs. Webster, Selby, Mally and Hinman. Prof. Lazenby read the following letter from that well-known patron of science, Emerson McMillen:

"Under the impression that the Ohio State Academy of Science has no fund with which to make investigations, or with which to reward a member for especially important work in the line of research or otherwise, and believing that such a fund might be used so as to return large profits in the way of scientific knowledge, I now offer to the trustees of the academy two hundred and fifty dollars (\$250), to be paid when called for."

A Famous Cow.

It gives us pleasure to notice in the "Country Gentleman" of December 15, 1898, a picture of that remarkable cow Koningen Van Friesland 5th, with a calf by her side, at the age of sixteen years, by a son of Pauline

Paul. Less than three years ago Mr. H. B. Van Cleve began at Dellhurst Farm, Mentor, O., to establish a herd of Holstein cattle out of which he hoped he might get both pleasure and profit. He obtained the basis of his herd at the dispersion sale of the Andalusia Dairy Co., Salem, O., of which J. Twin Brooks was the guiding spirit. Mr. Van Cleve has become a careful student of dairy cattle and has been a prudent buyer. The result has been that in this short time he has brought together a herd of considerable size and of high average merit. It is Mr. Van Cleve's aim and purpose to get together a herd each member of which shall produce at least 10,000 pounds of milk each year. Any one that knows anything about dairy cattle knows that Mr. Van Cleve has set himself a very high mark.

The Agricultural Student has always taken a deep interest in the enterprise at Dellhurst Farm, as several students of the College of Agriculture have been employed there.

Mr. Frank Ruhlen, of the class of '96, and at present assistant in agriculture at the Ohio State University, had charge of the farm and herd during the year 1897, and Mr. D. A. Crouner, of the same class, has charge of the herd at present.

In a letter to Professor Hunt, Mr. Van Cleve says in part:

"I take pleasure in mailing you a picture of the famous old Koningen Van Friesland 5th and her bull calf, sired by Pauline Paul's De Kol, the son of Pauline Paul, for which Mr. Hayes paid \$1000.

"This calf we expect to raise to head our Dellhurst herd.

"Koningen, when three years old made the milk record for the breed at her age, viz., 19,700 pounds in a milking year; butter record 20 pounds in seven days. At sixteen years old this cow is perfectly healthy, a regular breeder, pays a profit in the dairy in ad-

dition to her exceptional value as a breeder.

"Our total herd now numbers 103 head, counting young and old, over fifty of which are thoroughbred Holsteins.

"Mr. D. A. Crouner, a graduate of your College of Agriculture, has entire charge of the stock on the farm, and it gives us pleasure to report that he is making a success of the work. In addition to his knowledge of dairying, Mr. Crouner's pleasing manner, faithfulness, energy and perpetual good humor not only sets a good example, but makes it a pleasure to employ him."

Annual Meeting Columbus Horticultural Society.

The "annual meeting" of the Columbus Horticultural society was held in Horticultural Hall, Ohio State University, on December 31st, 1898. Beside the regular program, which consisted of the reports of the standing committees, a paper on "Forcing Bulbs," by Mr. Harry Ballou, and the discussion of the same by the members, the election of officers for the coming year was held. The officers elected are:

Wm. R. Lazenby, President.
 T. A. Scott, Vice President.
 John F. Cunningham, Secretary.
 Geo. W. Sinks, Treasurer.
 Executive Committee, O. W. Aldrich,
 Herbert Osborn and J. J. Janney.
 Chairmen of standing committees:
 Botany, L. H. McFadden.
 Vegetable Pathology, W. A. Keller-
 man.
 Entomology, J. S. Hine.
 Fruits, Geo. W. Gill.
 Plants and Flowers, Harry Ballou.
 Meteorology, Wm. R. Lazenby.
 Vegetables, H. M. Sessions.

Prizes Awarded.

On December 15, 1898, the prizes for judging dairy cattle offered to the students in animal industry in the College of Agriculture by W. B. Smith & Sons, Columbus, O., were awarded, the

presentation of money and badges being made by President Canfield. The winners of the prizes were as follows:

First Prize—H. J. Hammond, Sharon Center, O.

Second Prize—Merritt Harper, Grove City, O.

Third Prize—J. L. Roberts, Vaughns-ville, O.

Fourth Prize—J. G. Ridinger, Kalida, O.

Fifth Prize—E. W. Nettleton, Medina, O.

The Jerseys, which were scored, were contributed by Messrs. Boardman & Pinney, Worthington, O., while the Holsteins were from the herd of W. B. Smith & Sons.

It may be of interest to note that the best four Holstein cows in this contest averaged over fifty pounds of milk apiece in twenty-four hours on the day succeeding the scoring.

Sheep Husbandry.

During the first week in December there were in the livestock room of Townshend Hall seven breeds of sheep which were used by the class in animal industry for study and scoring. The Lincolns were furnished by W. H. Beatty, Harlem; the Shropshires by D. N. Dyer, Galena; the American Merinos by David Comstock, Sunbury; while the Delaine Merinos, Dorsets, Oxfords and Southdowns were furnished by the Miller's Stock Farms, Sunbury, O.

The lectures upon the characteristics of the breeds, upon the principles and methods of judging sheep were given by Dr. H. P. Miller, expert judge, who is a graduate of the College of Veterinary Medicine of the University, and well known as editor of the sheep department of the Ohio Farmer.

Atavism in Certain Compositae.

(JOHN H. SCHAFFNER)

Before Columbus Horticultural Society.

It is now generally admitted that the great sunflower family represents the

culmination of the plant kingdom. The members of this family have nearly reached the limit along most of the lines of progressive development recognized in the angiosperms, at least so far as the floral parts are concerned.

1. There is a reduction of the floral parts to four cycles with few numbers in each cycle.

2. Coalescence is present in the gynoecium, androecium and corolla and there is usually a very rudimentary calyx.

3. The development of zygomorphy has become a definite tendency usually involving only the outer flowers of the inflorescence in the intermediate forms, but affecting all of them in the highest ones.

4. The minimum number of seeds for each flower has been attained, in most cases, only a single seed with one embryo maturing.

5. There has been a shortening of the floral axis resulting in epigyny.

6. The peduncles have been reduced so that the flowers are sessile.

7. Shortening of the main axis has continued to such an extent as to form a disk and the leaves involved have been reduced to the scales of the disk and an involucre of bracts.

The last characteristic mentioned is the most striking feature of the compositae. The shortening of the axis of inflorescence or of the main axis of the plant is only a continuation of the same tendency shown in the evolution of the flower. Spore bearing is in itself an exhaustive process and has a tendency to stop growth, but when the seed habit was attained, involving the whole nutrition of the gametophyte and of the nonsexual embryo of the following generation the exhaustive process became very great. The shortening of the floral axis, of the peduncle, and of the axis of inflorescence might all be going on at the same time or each might be evolved separately. Examples of all conditions can be found in the higher plants; but it is probable that in the sunflower the

shortening of the axis below the inflorescence was the latest evolution since there seems to be a greater tendency for reversion in this region than in the others.

In the common sunflower the bracts of the involucre still bear some resemblance to leaves, while in the burdock they have changed to coriaceous scales tipped with a hook-pointed appendage, which is an adaptation useful for the dissemination of the seed. It is to these two plants that attention is called to illustrate what seems to be a general tendency toward reversion in the whole composite family. This reversion consists of a lengthening of the axis under certain favorable conditions and the changing back of the bracts to leaves. The original inflorescence of the sunflower for example represented a leafy raceme. The scales are the rudiments of the leaves containing the flowers in their axils, while the bracts of the involucre represent the leaves on the axis below. The shortening of the axis was brought about, as stated above, by the exhaustive process of anthesis and seed formation. The food which should have gone to make stems and leaves was used finally to furnish the ripening seeds with their supply. It is reasonable, therefore, to expect that if the plant has plenty of vigor for growth and an abundant supply of food, it should revert again to its old condition, lengthen the axis of inflorescence and change the bracts of the involucre back to leaves. And this is what frequently happens in nature. But the conditions may be easily controlled, and such plants as the sunflower and burdock can usually be made to show this kind of atavism whenever an illustration is desired. If a plant is nearly ready to produce flowers and has developed vigorous roots and leaves, and the upper part is then cut off the side branches which are left or which develop afterward will often have the bracts of their involucre changed back to leaves and the axis elongated. This is because the

vigorous roots, stems and leaves furnish the disks of the side branches with a greatly increased supply of food. In the burdock one is almost sure to get the desired results, and any one may have material at hand any summer or autumn, which will clearly represent the principle of atavism; and the cases will be all the more interesting because the facts are largely under the control of the experimenter. This principle might in some cases be useful to the florist where a leafy involucre would increase the beauty of an inflorescence. Many of our most striking and interesting cultivated flowers belong to the sunflower family and the varieties produced from certain species seem almost endless. But it seems that attention has been fixed almost entirely on the modifications of the corolla. Usually the desired object has been to transform all of the tubular corollas into the larger and more showy ligulate corollas and then to produce various peculiar distortions or zygomorphic effects. The change from the regular tubular corollas to the zygomorphic ligulate corollas is an upward tendency in most of the higher flowering plants and represents the principle of progressive development. It may be possible to develop varieties showing involucres of delicate leaves which would in many cases greatly enhance the beauty of the colored mass of corollas. This would be accomplished by courting the favor of atavistic tendencies, which have been shown above to exist in the composite inflorescence.

Here is a factor which the plant breeder must not overlook. The phylogeny of a plant should be determined and in many cases, no doubt, reversions to more ancient forms may bring about interesting or useful structures which may in many instances be of practical value in bringing out desirable varieties.

Reversions may be of two kinds:

First, a checking of the growth of an organ before its ontogeny has tra-

versed the entire record of its phylogeny. Such cases are represented by microcephalic men or by men born with gill slits in their necks.

Second, a reversion may occur by continuing the development of an organ which has been aborted in the course of its phylogeny. Such cases are represented by horses with three well developed toes on each foot, or by the case in hand where the reduced stem and leaves are developed to the same extent as they were in more ancient times.

Wheat Growing.

Ask the farmer if he knows how to raise wheat, and you will generally get the answer in the affirmative. Ask him again what his average yield of wheat is and when he tells you, ask the cause and he will say that it is no fault of his. He says that "the season was not favorable," or "that his soil is not adapted to wheat raising," or "that the fly injured it," or "that too much thawing and freezing in the spring" cut down the yield.

All these do have their effect on the yield of a wheat crop, but the greatest cause of all is the farmer himself. You say that is saying a great deal. can it be substantiated? Yes! Let us look into these reasons and see if they are built on a valid foundation. "Season not favorable." Walk over a wheat field in the spring months of April, May or June and note carefully the difference in the size of the wheat, the greater amount on a given piece of the field, and the difference in the color of the plants. This is more noticeable in wheat fields that have been badly managed, and the prospects for a crop are poor.

These points could be noticed very plainly last spring. Last year was a very poor wheat year, but in fields that averaged eight to twelve bushels per acre, patches could be found that if the field was all as good it would yield about twenty-five bushels per acre. Could we

say that the season favored different parts of the field differently?

"The soil is not adapted to the raising of wheat." If this is the case, go out of the growing of wheat, bring in the "law of substitution," and raise some other crop and let the growing of wheat to the farmers of Argentine or Dakota, or some one who is willing to produce it under the "law of diminishing returns."

"The fly injured it." The fly works on wheat that is sown too early in the season, and on wheat that is sown among clods. To obviate this, wait until the season of wheat sowing comes, and then have a good dust bed to receive the wheat.

"Too much thawing and freezing in the spring." We have no control over the weather, but if the land is well under drained, well fertilized with barnyard manure, or a system of rotation followed, a good seed-bed prepared, seed sown at the proper time, thawing and freezing will not have the effect that they do when these points are neglected. As soon as we understand wheat growing as we should, or as well as some professional men understand their business, the average yield of wheat, instead of being where it is, will be around forty bushels.

Forty bushels per acre are being raised by a great many farmers. Those who get this yield are those who have fairly good wheat land, but above all, they do their part.

WM. GILMORE.

The Utility of the Exotic Conservatory.

Exotic conservatories, whether large or small, are in a transition stage. They are no longer a luxury, in the sense they were but a few years ago, but are rapidly being looked upon as a necessity. This is true, especially in connection with parks, universities, colleges and other institutions of a public character. Considering them on a smaller scale, they seem to be just as much of a necessity as on the larger scale. The person of wealth is no longer alone in enjoying

the products of his glass house full of nice plants. Those of lesser means are availing themselves of such privileges and seem to think it very necessary to do so.

DOES IT PAY?

In thinking of exotic conservatories, perhaps the first question a good many people ask is, does it pay? We want to see everything turn into solid coin. Too many people, as yet, cannot figure out the utility of a thing unless they can see the dollars and cents which that thing produces.

When we ask the question, Does it pay? We mean to inquire if it returns more cash than we put into it. If such is the case then it is profitable, but if the reverse is true then it is unprofitable. Returns are not always measurable by the increase of our bank deposit. Some times we profit indirectly. The father sends his son to school. About the time that he completes his education he starts in business for himself. Where is the profit to the father? And yet he will do the same thing by the second son, and by the third and fourth. The state spends yearly immense sums of money to maintain its schools and universities. The United States government grants annually to each agricultural college and experiment station some \$35,000 for the enlightenment of its people. Does it pay? Yet the state and nation continue to scatter educational institutions broadcast throughout the land.

I am confident that if we are able to appreciate the influence of the exotic conservatory, we will grant that it is no longer a luxury, to be enjoyed only by the millionaire, but a necessity and should be accessible to all classes. In connection with our universities and colleges it is rapidly becoming an indispensable laboratory of research.

CONSERVE.

But what are the uses of the exotic conservatory? The name indicates its first use, viz.: To conserve or protect foreign plants. To keep plants not

native of the particular country or locality in which we live. This is an important feature, for it enables us to possess a flora which we otherwise could not have. It puts within our reach some of the beautiful attractions of other sections of the globe, and enables us, though we live in a country where frost and snow abound a portion of the year, to enjoy some of the finest tropical plants.

The conservatory enables all classes to see natives of equatorial climes in tropical conditions, while our outside temperature may fall below the zero mark. It enables even those with medium means, nay, even the poor, to see the graceful palm, the ever attractive banana, or the interesting *Monstera* without exposing themselves to a long journey and a considerable expense.

Perhaps these people have long desired to see just such things.

RECREATION.

Perhaps we have been grappling with some weighty question and are weary. To spend some moments in the conservatory and commune with the representatives of a distant land, to hear them relate bits of their natures and desires, to see them with their large spreading leaves or their magnificent array of colors, is certainly pleasant diversion to say the least. These creatures of the distance have an interesting message, even for the weary. To be ushered into the home of such friends and permitted to commune with them fills one with a something which is both restful and inspiring. Thus we are transported, for the time being, to a strange land far distant from the thing that wearied us, and we are much refreshed.

EDUCATIONAL — BOTANICAL ILLUSTRATION.

In these days of advanced education an exotic conservatory is an indispensable adjunct to a botanical department. Botany is one of those sciences which cannot be successfully taught in an abstract manner. To be able to draw

illustrative material, in the form of growing plants not only makes the work of teaching easier, but more effective. The conservatory usually has plants of all descriptions showing all forms and kinds of plant life. This gives splendid opportunity to illustrate the subject in hand in various ways. This gives much greater possibilities even to the duller minds.

A PLACE OF RESEARCH.

There are those who will do research work in the conservatory. Such may be college students, or they may be scientists. To have within easy reach an exotic conservatory which contains a good collection of growing plants representing different parts of the globe, is a decided help to these two classes. Without the conservatory the college student is at once barred from such study. The scientist can pursue his investigations only by undertaking a very long journey to all parts of the globe at an immense outlay of money. The investigations made by these scientists and students put within reach of the public some very valuable information. Prof. H. C. Irish, of the Missouri Botanic Garden, in writing me along this line of thought, says: "Some things may be known about these exotic plants that otherwise might never have been known, or, at least, not for many years."

THE PUBLIC SCHOOL.

It seems to me that the teachers in the public schools could do no better than to take their pupils on an occasional excursion to such a conservatory, if one be within reach, and encourage them to write compositions, or talk about what they saw. This would not only be profitable in breaking the monotony of the school room, or supply good subject of thought, but would lead the pupils to really see what they are looking at. I think that is one thing we neglect too much with the children. We do not teach them true observation. You say we can teach them observation on the school ground. Very true, but there it

soon gets old, the things they see there are common, they see them every day, and really tire of them. In a good conservatory there is something new almost daily. These things are just as interesting to children as they are to adults. This fact has been most forcibly impressed upon my mind within the past three months. School children come into our conservatory and ask me questions by the dozen about some of the plants. Or, as they gaze upon the large palm, the banana, or the blossom of the night blooming cactus, they are amazed at such wonderful things. They sometimes tell me how they use the things at school which we have from time to time sent them.

There is yet another point of information which the pupil as well as any one gets by visiting the conservatory. He will increase his knowledge on plant geography. I never can forget the lasting impression made upon my mind in this line some years since. In our geography class we had studied about tropical plants. A few days later I happened to visit Lincoln park in Chicago. There were the palms, yonder stood a banana tree bearing fruit. How they appealed to me. The intense longing which sprang up within me, when reading about such things in my geography, to see the tropics and their plants, was here in a large measure gratified. My conception of the tropics was no longer abstract, but now more concrete. That scene was indeed one of the memorable events of my life. Words are very inadequate to express my feelings as I, a school boy, stood gazing upon the representatives of tropical lands.

Depending upon the too abstract descriptions in his book, as the pupil has to, he cannot form a very accurate conception of such things. But if he can see a few specimens of plants growing it will aid him materially in forming a more correct notion of foreign countries.

AESTHETIC.

The more we see of the beautiful the better are we able to appreciate beauty.

Coming frequently in contact with that which is fine the more accurate and just is our estimate of the fine. We cannot truly appreciate a thing with which we have no sympathy. We can have no sympathy with a thing unless we study it. We cannot study a thing unless it be within our reach. I think we need to give more attention to the cultivation of the aesthetic side of man. There are so many beautiful things all about us which escape our notice, which is due to the fact that we do not know how to look at beauty. To educate along this line we need something striking. Something that will appeal to man with such force as to claim his attention, in some cases in spite of himself. The things in the plant line that will achieve this most readily are those brought from other countries. There is something novel about them and they have a claim on his interest when the beautiful things about him would be left unnoticed.

ETHICAL.

We now come to that phase of our subject, which I believe is little or not at all considered when we think of the utility of exotic conservatories, or of plants in any sense. We are told that man was created the crown of creation. Then all the other things in this world must be subordinate, or for his use. God created man in his own likeness, and consequently intended that the ethical side of man be carefully cultivated. Man was environed by these though subordinate, yet wonderful and beautiful things, not only to give him temporal sustenance, but to aid him in the highest ethical development. I believe all these so-called various things play an important role in the ethical economy of man. While man does not seem to be conscious of it, I believe that even some of the apparently insignificant things do not receive the credit due them for the wholesome influences they exert over man. Here let me again quote my friend Prof. Irish. He says: "The exotic conservatory adds much to the popular

knowledge of exotic plants and especially tends to influence the young toward a love for all plant life about them, and with that interest awakened they have less time to think of those things which tend to demoralize."

That the inmates of an exotic conservatory do their share toward man's ethical as well as intellectual development I have no doubt.

It is always interesting to me to see people admiring the exotics. These interesting scenes are not mere incidents of pleasure, but they are, to me, illustrations of the value of plant life. Some one enters the conservatory. His eye falls upon the large palm. He for a moment or two is lost in admiration. Perhaps he is viewing the tree fern, which is arousing all his interest. It is not necessary to give the large plants all the credit for this influence, for some of the smaller ones are just as wonderful and beautiful, and they are just as powerful in their appeals to mankind as are their giant neighbors. As the person stands silently, intently, studying that wonderful object before him, deeply absorbed in the habit of growth, the method of branching, the unfolding of the leaves, the peculiarity of the blossom, he for the time being is in another sphere communing with other beings. He queries why and how? and thus his mind soars higher and higher, and as it rises, it seems to me, becomes purer. Possibly it reaches heights never before scaled. Feeling no doubt, often times, a strong appeal to a better and nobler life.

Veterinary Items—Notes from the Operating Room.

CARE OF HORSES' TEETH.

It is surprising how little the care of horses' teeth is understood and appreciated even by horsemen. The dressing of teeth is almost a daily occurrence and on some days as high as five mouths have been cleaned up. The average owner never thinks of watching a horse's teeth and his attention is only called to

it when the animal has become much emaciated or behaves in a peculiar way while eating or being driven. Oftentimes they are at a loss to account for the loss of condition and generally attribute it to "his blood being out of fix." It is almost an impossibility to get an owner to take anything like the proper care of a horse after a dental operation like trephining, even if they know the future value of the animal is dependent on good care. An interesting case illustrating this point has been under our observation for some time. May 27th, '98, a well bred, brown mare, in splendid condition, was brought to the veterinary department for treatment. She was suffering from a cavity of the first molar on left superior maxilla, which was accompanied by the peculiar characteristic offensive odor which had drawn the owner's attention to it. The mare was operated on, the tooth was removed by trephining. After trephining, while in the hospital, the opening was carefully cleaned and a fresh plug of cotton to keep particles of food out, was inserted daily, the wound was healing nicely and gave every prospect of a complete recovery when the animal was removed. The owner was cautioned that he must take the best of care, keep openings thoroughly clean and aseptic until healed. In October the same mare was brought back by another owner, however, who stated that for the last few days he had noted a discharge from the nostril on the left side. Examination showed that no care had been taken of the wound, the external opening had healed nicely, but hay, etc., had been allowed to pass through the inner wound, in the alveolus of the removed tooth, and had finally forced through into the nasal passage, making a fistulous opening which will be very difficult to heal. A little care at the proper time would have prevented this and saved a splendid animal from becoming almost worthless, although perfectly sound in every other respect. She has been brought back by several own-

ers, who, when they learned the history of the case, decided as they had been "stuck" in a trade that they would stick somebody else. It is worth well noting in this connection that a gray mare suffering from exactly the same diseased tooth was operated a few days before. The two operations were identical, the gray was left in our care longer, was carefully treated after removal and made a perfect recovery.

AN INTERESTING CASE.

On December 8 an aged brown Gelding was brought to the veterinary hospital and purchased for anatomical purposes. Although the horse was about 18 years old, it was in fine flesh, but had evidently been neglected for some time. The animal had a double sided nasal discharge of a most offensive character. We were not able to get a very complete history of the case from the boy who brought the horse. As far as we could learn, the animal had been affected in this way for about two years and had been brought to us for treatment once, a year or so ago. Nothing abnormal was found on thorough examination except the nasal discharge. The diagnosis made was a filling of frontal and nasal sinuses from some cause, giving rise to a catarrh of the mucous membranes and the consequent discharge. An examination of the mouth revealed nothing but the sharp, angular teeth with long points usually found in old horses. As the horse was to be used for anatomical purposes very soon, no treatment was attempted. On postmortem an unusual and interesting condition was revealed. In addition to a pair of "wolf teeth" and the usual six molars, on each side of the superior and inferior maxilla a perfectly developed supernumerary molar was found. The tooth was perfect in its development and in perfect line with the other molars. It is not unusual to find both supernumerary teeth both molars and incisors. They usually are milk teeth which have not been shed, the permanent tooth coming in crowds it out of place and in

some instances attaches itself to the permanent tooth. In this case the supernumerary tooth was exactly like the other molar in size and shape and of the same apparent size. The space between the sixth and seventh superior molars was a trifle greater than between the other molars and they also slanted from each other leaving a V-shaped space between them. The constant irritation of food during mastication to this exposed portion of the gum had at some time set up an inflammation there which gradually became deep seated and finally broke into the superior maxillary sinus. This, of course, made a direct communication between the mouth and the superior maxillary sinuses. This had taken place on both sides, but from the incomplete history of the case we were not able to tell whether this occurred on both sides at the same time or not. During mastication particles of food were worked up through this opening and filled the sinuses. Of course this irritation to the mucous membrane set up an inflammation and as there was no way of getting rid of this impacted mass the condition became chronic. The discharge of the decomposing food became so offensive that the animal was practically worthless even though sound otherwise. A large mass of partially decomposed food was taken from the sinuses after death and the mucous membranes were enormously thickened and almost black in color. Nothing could have been done that would have been of much value at this advanced stage, but if treated earlier, before the inflammation had penetrated the sinuses it might have been prevented. It would have been a difficult cure at best. An extraction of the seventh molar would have been necessary and the wound would have required the greatest care and owing to the location it would have required constant veterinary care. Filling of the maxillary and frontal sinuses is not at all uncommon, but the occurrence of 44 perfectly developed teeth instead of the usual 40 is

a very unusual thing and is the first case ever seen here. How many such cases have escaped observation is only a matter of conjecture, but as there are no cases recorded in veterinary literature, it is fair to presume at least that such a case is very rarely observed.

Fertilizers in Northeastern Ohio.

The agriculture of northeastern Ohio has rarely received any attention from writers in the dairy industry. Apparently one reason for this lies in the fact that most of the farms are small and devoted to general farming. In this section two hundred acres would be an exceptionally large farm. There is in this part of the state, however, at present much work carried on that is of interest to all farmers. This is in regard to commercial fertilizers.

The soil at a distance from the lake is mostly a clay, but there are sections of sandy and gravelly loams. Some of the farms have been worked for a long time and the products constantly sold until the land has become deficient in some of the essential plant foods. This fact has been forcing itself upon the farmers and they are beginning to realize that if they are to make farming profitable or even to make a livelihood out of it they must replace some of the elements taken off the farm. For several years some of the foremost men have been experimenting with commercial fertilizers, and are now getting into a position where they can judge intelligently what their soils need. For some time the experiment was a costly one, but now they are beginning to get back some of the money they have expended. It has been found here, as well as elsewhere on clay soils, that nitrogen as a rule gives the best results in wheat production. The leguminous crops, such as clovers, peas, beans, etc., are called nitrogen producers, because most of their nitrogen comes from the air, and they get little benefit from the use of nitrogenous manures.

The phosphates are especially beneficial for certain crops such as clovers, turnips and all root crops as well as grain crops of every kind. The fact that potash causes an early ripening of crops is of special value to market gardeners who raise melons, squashes, grapes, etc., that are liable to injury from frost in the fall. Fruit trees and grapevines require a large amount of potash.

Nitrogen in the form of organic nitrogen is derived from animal and vegetable matter containing nitrogen, such as dried blood, meat and bones, and the complex substance "tankage" which is made up of the wastes from slaughterhouses, garbage of cities, etc. The sulphate of ammonia and the nitrate of soda contain large amounts of nitrogen in a soluble form which is readily taken up by the plant. Commercial potash usually comes in the form of muriate and sulphate of potash, or of kainit.

It will be readily noticed from the above that, with the exception of the fruit-growing section, nitrogen is the most important fertilizer and, generally speaking, the one to be used. Clay soils furnish large amounts of potash and consequently the money that is ordinarily put into potash fertilizers in this section of the state is of little use.—F. S. Johnston.

Finance.

The task of commenting upon the country's financial condition in time of such prosperity becomes greatly simplified with the tendencies all in one direction. December is not usually an excellent month for business and ordinarily there is a perceptible shrinkage as compared with the previous month, but old traditions of ante-holiday inactivity were wholly disregarded this year. There is also, as December advances, a dullness in Wall street; the pulse of the general market, usually incident to that month on account of the nearness of holiday interruption, the making up of yearly accounts, the settlement of balances and the withholding of opera-

tions for January in anticipation of a probable increased activity common to that month. But on the contrary stock market prices last month reached the highest average level in years and the activity was upon an unprecedented scale.

So a review of some of the recent records of institutions which most correctly reflect the pulsations of business conditions show very favorable results. The general aspect of affairs in Wall street did not materially change during the month except for prices to reach a higher average level and the aggregate of sales to daily become larger. The reconvening of congress did not even serve as a disturbing factor in the market; but, on the contrary, the street generally looked to Washington with hope instead of distrust. An early inspiration for speculative strength in stocks was soon found in the final announcement of terms of peace with Spain, when the only deterring influence which has been over speculation since the election bugbear was disposed of, was entirely removed by the international settlement.

Money is abundant and easy to borrow at low rates regardless of the immense buying and selling which has been going on the past few weeks. Certainly the unusual strength of the present and past market is an immense surplus of money seeking investment in securities rather than going to new commercial enterprises, which was an expected tendency that has not developed so rapidly. Then added to the plethora of money already commanding low rates for investment was the dividend and interest disbursements of the new year. The vast amount of money in the country has been emphasized by a proposed reduction of interest by savings banks in a time of general business prosperity. Following that announcement came the news that bills will be introduced in the legislatures of several states to reduce the legal rate of interest charged.

A careful review of the comparative statements of some of the authoritative statistical agencies shows the firm backing the country's finance possesses. Readers who care to be well informed should examine these documents themselves and not rely upon figures gotten up by some one of a certain opinion to tell his own story most plausibly, as they may be made to appear to prove almost any statement.

The statement of bank clearings in the United States shows that they have been a good deal larger than ever before, November aggregating a billion dollars more than the same month of 1892, an undisputed year of prosperity. A comparison of the eastbound tonnage from Chicago shows an increase over corresponding weeks of 1892 of from 25 to 40 per cent. For many weeks this year the movement was nearly double what it was last year. The balance of trade in favor of this country has never been greater in its history. An increase of more than \$100,000,000 in exports and a decrease of \$100,000,000 in imports is the record of the country's foreign commerce in ten months ending October 31, 1898, compared with the corresponding period of the preceding year. America has been furnishing two bushels to the remaining world's one of the wheat received by importing nations. Recent statements of railway earnings have been extremely gratifying and have imparted great steadiness to the value of their stocks; being from two to three per cent. better than for the same periods of last year.

These must be recognized as evidences of a very great increase in the amount of business being done. And as the business situation improves, the intrinsic worth of properties becomes greater. Even with the enormous volume of trade it is a general fact that the rate of profits is smaller and prices are generally lower than they have been, but this is due to the vast accumulation of capital and the energy of competition in production like the re-

duction in the rate of interest, which change is unfavorable to the capitalist, in itself, but is a gain for the whole community. Increases of wages have not been frequent, but the volume of business has practically absorbed all unemployed labor, which is a very favorable condition. What this country now needs is not so much a glorious boom as a happy continuance of present conditions which are probably more universally satisfactory than for many years.

C. L. S.

Triple Current Separator.

The experimental days of the cream separator are past, and the question now among dairymen is not "Is it best to have a separator?" but "What is the best separator to have?"

The essential part of a separator is its bowl, for therein is the process of separation carried on; and the value of the machine varies according to its ability to recover the cream from the milk and leave it in such a condition as to produce the most and best quality of butter. There are many different makes of separators, some of which leave more and some less fat in the skim milk, but there is one that practically leaves none and its cream produces butter that is taking premiums from Maine to Washington. That is the one so much in demand today, namely, the IMPROVED UNITED STATES CREAM SEPARATOR, otherwise known as the TRIPLE CURRENT SEPARATOR, manufactured by THE VERMONT FARM MACHINE CO., Bellows Falls, Vt. In this bowl the milk passes three times its height, thereby obtaining its name, "Triple Current," a feature possessed by no other, and it is due to this long journey so complete separation is possible.

The rapid increasing sales of this separator speak plainly of its popularity among dairymen and creamerymen the country over; but its success is no more than deserved for it is a thoroughly well

made machine in every particular, and every intending purchaser of a cream separator should investigate carefully its points of excellence, and they are many, before purchasing some other make.

Remember that in the Improved U. S. Separator you not only have a clean skimmer, but a machine noted also for its durability, for the little power required to operate and the ease with which it can be cleaned.

For further information, write the Manufacturers, who will gladly send you illustrated catalogues free of charge.

BOOK REVIEW.

OUTDOOR STUDIES:—James G. Needham, pp. 90; cloth. Illustrated in black and white. American Book Company: New York, Cincinnati, Chicago.

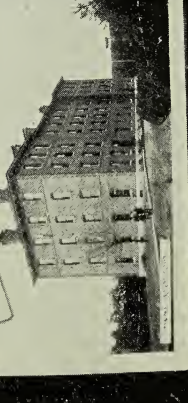
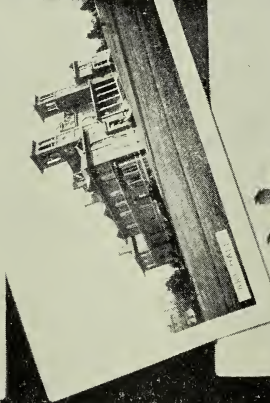
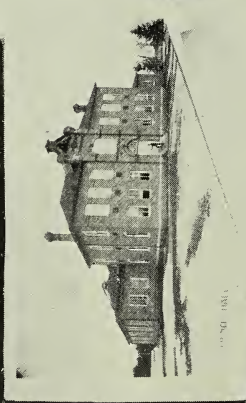
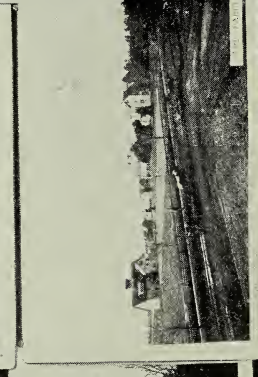
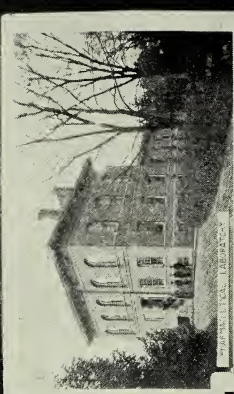
This book is one of a series of readings which appear under the title of the "Eclectic School Readings" meant to supply food for thought for those years that intervene between the primary school and the high school or college. They demand a more extended observation and a closer application than do the mere lessons that are furnished the primary pupils, and a preparation of more or less experience in observation is pre-supposed.

Among the subjects referred to and discussed we notice: The fertilization of plants, the habits of mature animals, the life history of some of our more interesting insects, insects that visit certain plants, and many other natural history matters that may be studied every day we are out in summer time.

The book is written in a clear, conversational style, and is well calculated to arouse the interest of the young student of nature, and to inspire observation on the part of all who read it.

For high schools and academies it is to be recommended as a general reading book. It might well be placed in all public school libraries, where life study is being taught to any extent.





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